AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. *(Original)* An optical waveguide structure comprising a core layer having a first refractive index n_{core}, an array of sub-regions within the core having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and giving rise to a photonic band structure experienced by an optical mode travelling through the waveguide structure, and a cladding layer adjacent to the core layer having a refractive index $n_{cladding}$, wherein:

$n_{core} > n_{rods} \exists n_{cladding}$ and $n_{core} - n_{rods} > 0.1$.

2. *(Original)* An optical waveguide structure according to claim 1, wherein the array of sub-regions gives rise to a photonic bandgap.

3. *(Original)* An optical waveguide structure according to claim 1, wherein the waveguide structure is a planar waveguide structure further including a buffer layer having a refractive index n_{buffer}, wherein the core layer is positioned between the buffer layer and the cladding layer and wherein:

$n_{core} > n_{rods} \exists n_{buffer}$.

4. *(Original)* An optical waveguide structure according to claim 1, wherein the waveguide structure is an optical fibre structure, the cladding layer surrounding the core layer.

5. *(Original)* An optical waveguide structure according to claim 1, wherein the core layer has a refractive index between 1.4 and 4.

6. *(Original)* An optical waveguide structure according to claim 1, wherein the sub-regions have a refractive index between 1.3 and 1.6.

7. *(Original)* An optical waveguide structure according to claim 1, wherein the cladding layer has a refractive index between 1.3 and 1.6.

8. *(Original)* An optical waveguide structure according to claim 3, wherein the buffer layer has a refractive index between 1.3 and 1.6.

9. *(Original)* An optical waveguide structure according to claim 1, wherein the sub-regions are formed from silicon oxynitride or silicon dioxide.

10. *(Original)* An optical waveguide structure according to claim 1, wherein the core layer is formed from silicon nitride, doped silica, tantalum pentoxide or doped tantalum pentoxide.

11. *(Original)* An optical waveguide structure according to claim 1, wherein the cladding layer is formed from silicon dioxide.

12. *(Original)* An optical waveguide structure according to claim 3, wherein the buffer layer is formed from silicon dioxide.

13. *(Original)* An optical waveguide structure according to claim 1, wherein the sub-regions extend through the cladding layer as well as the core layer.

14. *(Original)* An optical waveguide structure according to claim 3, wherein the sub-regions extend partially or fully into the buffer layer.

15. *(Original)* An optical waveguide structure according to claim 1, wherein the cladding layer includes sub-regions corresponding to the sub-regions in the core layer having a refractive index which is greater than or equal to the refractive index of the cladding layer but which is less than or equal to the refractive index of the sub-regions in the core.

16. *(Original)* An optical waveguide structure according to claim 1, wherein the core layer includes a lateral waveguiding region having no sub-regions.

17. *(Original)* An optical waveguide structure according to claim 16, wherein the waveguiding region includes a waveguide bend.

18. *(Original)* An optical device including an optical waveguide structure according to claim 1.

19. *(Original)* A method of manufacturing a optical waveguide structure comprising the steps of:

providing a core layer having a first refractive index n_{core};

providing an array of sub-regions within the core having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and giving rise to a photonic band structure experienced by an optical mode travelling through the waveguide structure; and

providing a cladding layer adjacent to the core layer having a refractive index $n_{cladding}$; wherein:

$n_{core} > n_{rods} \exists n_{cladding}$ and $n_{core}-n_{rods} > 0.1$.

20. *(Original)* A method according to claim 19, wherein the optical waveguide is planar, the method further including the step of providing a buffer layer having a refractive index n_{buffer} on the opposite side of the core layer to the cladding layer, wherein:

$n_{core} > n_{rods} \exists n_{buffer}$.

21. *(Original)* A method according to claim 19, wherein the optical waveguide is an optical fibre, the method further including the steps of:

providing the cladding layer surrounding the core layer.

22. *(Original)* A method of guiding an optical signal comprises the step of passing an optical signal through a waveguiding region of an optical waveguide structure comprising a core layer having a first refractive index n_{core}, an array of sub-regions within the core layer having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and giving rise to a photonic band structure experienced by an optical mode travelling through the waveguide structure, and a cladding layer adjacent the core layer having a refractive index $n_{cladding}$, wherein:

$n_{core} > n_{rods} \exists n_{cladding}$ and $n_{core} - n_{rods} > 0.1$.

23. *(Original)* A method according to claim 22, wherein the optical waveguide structure is a planar structure, further including a buffer layer having a refractive index

n_{buffer}, wherein the core layer is positioned between the buffer layer and the cladding layer and wherein:

$$n_{core} > n_{rods} \exists n_{buffer}.$$

24. *(Original)* A method according to claim 22, wherein the waveguide structure is an optical fibre structure, wherein the cladding layer surrounds the core layer.

25. *(Original)* An optical waveguide structure comprising a core layer having a first refractive index n_{core}, and a 2-dimensional array of sub-regions within the core layer having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and giving rise to a photonic band structure within the core layer, and a cladding layer adjacent the core layer having a refractive index $n_{cladding}$ wherein:

$$n_{core} > n_{rods} \exists n_{cladding}.$$

26. *(Original)* An optical waveguide structure according to claim 25, wherein $n_{core} - n_{rods} > 0.1$.

27. *(Currently Amended)* An optical waveguide structure according to claim 25 ~~or 26~~, wherein the waveguide structure is a planar waveguide structure, the core layer being formed between the cladding layer and a buffer layer, the buffer layer having a fourth refractive index n_{buffer}, wherein:

$n_{core} > n_{rods} \exists n_{cladding}$ and n_{buffer}.

28. *(Currently Amended)* An optical waveguide structure according to ~~any one of claims 25-26~~claim 25, wherein the waveguide structure is an optical fibre, the cladding layer having surrounding the core layer.

29. *(Original)* A method of manufacturing a optical waveguide structure comprising the steps of:

providing a core layer having a first refractive index n_{core};

providing a cladding layer adjacent to the core layer having a refractive index $n_{cladding}$;

forming a 2-dimensional array of holes in the core layer extending longitudinally along the waveguide structure;

filling the holes with a material having a second refractive index n_{rods}, wherein:

$n_{core} > n_{rods} \exists n_{cladding}$

30. *(Original)* A method according to claim 29, wherein $n_{core} - n_{rods} > 0.1$.

31. *(Currently Amended)* A method according to claim 29 ~~or 30~~, wherein the optical waveguide is a planar waveguide, the method further including the steps of:

providing a buffer layer having a refractive index n_{buffer} on the other side of the core layer to the cladding layer; wherein:

$n_{core} > n_{rods} \exists n_{cladding}$ and n_{buffer}.

32. *(Currently Amended)* A method according to ~~any one of claims 29-31~~claim 29, wherein the optical waveguide is an optical fibre, the method including the step of:

providing the cladding layer surrounding the core layer.

33. *(Original)* A method of guiding an optical signal comprising the step of passing an optical signal through a waveguiding region of an optical waveguide structure comprising a core layer having a first refractive index n_{core}, a 2-dimensional array of sub-regions within the core layer extending longitudinally along the waveguide having a second refractive index n_{rods}, the array of sub-regions giving rise to a photonic band structure within the core layer, and a cladding layer adjacent to the core layer having a refractive index $n_{cladding}$, wherein:

$n_{core} > n_{rods} \exists n_{cladding}$.

34. *(Original)* A method according to claim 33, wherein $n_{core} - n_{rods} > 0.1$.

35. *(Currently Amended)* A method according to claim 33~~ or 34~~, wherein the waveguide is a planar waveguide, wherein the core layer is formed between the cladding

layer and a buffer layer, the buffer layer having a fourth refractive index n_{buffer}, and wherein:

$n_{core} > n_{rods} \exists n_{cladding}$ and n_{buffer}.

36. *(Currently Amended)* A method according to ~~any one of claims 33-35~~claim 33, wherein the optical waveguide is an optical fibre, wherein the cladding layer surrounds the core layer.